



Designation: A1079 – 17 (Reapproved 2023)

Standard Specification for Steel Sheet, Complex Phase (CP), Dual Phase (DP) and Transformation Induced Plasticity (TRIP), Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process¹

This standard is issued under the fixed designation A1079; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This specification covers steel sheet, complex phase (CP) grade, dual phase (DP) grade, and transformation induced plasticity (TRIP) grade, zinc-coated (galvanized) or zinc-iron alloy-coated (galvannealed) by the hot-dip process in coils and cut lengths.

1.2 The product is produced in various zinc or zinc-iron alloy-coating masses or coating designations as shown in [Table 1](#).

1.3 Product furnished under this specification shall conform to the applicable requirements of the latest issue of Specification [A924/A924M](#), unless otherwise provided herein.

1.4 The product is available in a number of designations and grades with mandatory chemical requirements and mandatory mechanical properties that are achieved through thermal or thermal-mechanical treatments, and are designed to be compatible with automotive application requirements.

1.5 The grade designation nomenclature of the product differs from other hot-dip sheet products having mandatory mechanical properties in that ordering is to tensile, rather than yield strength values.

1.6 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.7 The text of this specification references notes and footnotes that provide explanatory material. These notes and footnotes, excluding those in tables and figures, shall not be considered as requirements of this specification.

1.8 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appro-*

¹ This test method is under the jurisdiction of ASTM Committee A05 on Metallic-Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.11 on Sheet Specifications.

Current edition approved April 1, 2023. Published April 2023. Originally approved in 2012. Last previous edition approved in 2017 as A1079 – 17. DOI:10.1520/A1079-17R23.

priate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- [A90/A90M Test Method for Weight \[Mass\] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings](#)
- [A370 Test Methods and Definitions for Mechanical Testing of Steel Products](#)
- [A902 Terminology Relating to Metallic Coated Steel Products](#)
- [A924/A924M Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process](#)
- [D7396 Guide for Preparation of New, Continuous Zinc-Coated \(Galvanized\) Steel Surfaces for Painting](#)
- [E646 Test Method for Tensile Strain-Hardening Exponents \(\$n\$ -Values\) of Metallic Sheet Materials](#)
- [B6 Specification for Zinc](#)
- [B852 Specification for Continuous Galvanizing Grade \(CGG\) Zinc Alloys for Hot-Dip Galvanizing of Sheet Steel](#)

3. Terminology

3.1 *Definitions*—See Terminology [A902](#) for definitions of general terminology relating to metallic-coated hot-dip products.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *complex phase (CP) steel, n*—steel sheet with a ferritic/bainitic matrix containing small amounts of retained

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard

TABLE 1 Mass of Coating Requirements^A

NOTE 1—Use the information provided in 8.1.2 to obtain the approximate coating thickness per side from the coating mass.

	Single Spot/Single Side Coating Mass		
	Coating Designation	Minimum, g/m ²	Maximum, g/m ²
Zinc	20G	20	70
	30G	30	80
	40G	40	90
	45G	45	95
	50G	50	100
	55G	55	105
	60G	60	110
	70G	70	120
	90G	90	160
	100G	100	200
Zinc-Iron Alloy	30A	30	60
	40A	40	70
	45A	45	75
	50A	50	80

^AThe coating designation is the term by which the minimum single spot/single side coating mass is specified for each side.

austenite, or pearlite, or both where significant grain refinement is caused by retarded crystallization or precipitation of microalloying elements.

3.2.2 *dual phase (DP) steel, n*—steel sheet with a ferritic matrix containing a martensitic phase present in the form of islands.

3.2.3 *transformation induced plasticity (TRIP) steel, n*—steel sheet with a mainly ferritic matrix containing retained austenite where, during the forming process, retained austenite can transform to martensite.

3.2.4 *zinc-iron alloy, n*—a dull grey coating with no spangle pattern that is produced on hot-dip zinc-coated steel sheet.

3.2.4.1 *Discussion*—Zinc-iron alloy coating is composed entirely of inter-metallic alloys. It is typically produced by subjecting the hot-dip zinc-coated steel sheet to a thermal treatment after it emerges from the molten zinc bath. This type of coating is suitable for immediate painting without further treatment except normal cleaning (refer to Guide D7396). The lack of ductility of the alloy coating presents a potential for powdering.

4. Classification

4.1 The material is available in several designations and grades as follows:

4.1.1 Complex phase (CP) steel (Grades 600T/350Y, 780T/500Y, and 980T/700Y),

4.1.2 Dual phase (DP) steel (Grades 440T/250Y, 490T/290Y, 590T/340Y, 780T/420Y, and 980T/550Y), and

4.1.3 Transformation induced plasticity (TRIP) steel (Grades 690T/410Y and 780T/440Y).

4.2 The material is available as either zinc-coated or zinc-iron alloy-coated in several coating masses or coating designations as shown in Table 1.

4.2.1 The material is available with the same or different coating designations on each surface.

5. Ordering Information

5.1 Zinc-coated or zinc-iron alloy-coated sheet in coils and cut lengths is produced to thickness requirements expressed to

0.01 mm. The thickness of the sheet includes both the base metal and the coating.

5.2 Orders for product to this specification shall include the following information, as necessary, to adequately describe the desired product:

5.2.1 Name of product [steel sheet, zinc-coated (galvanized) or zinc-iron alloy-coated (galvannealed)],

5.2.2 Designation of sheet [CP (Grades 600T/350Y, 780T/500Y, or 980T/700Y), DP (Grades 440T/250Y, 490T/290Y, 590T/340Y, 780T/420Y, or 980T/550Y), or TRIP (Grades 690T/410Y or 780T/440Y)].

5.2.3 ASTM designation number and year of issue, as A1079.

5.2.4 Coating designation (see 8.1.3),

5.2.5 Minimized spangle (if required),

5.2.6 Chemically treated or not chemically treated,

5.2.7 Oiled or not oiled,

5.2.8 Extra smooth (if required),

5.2.9 Phosphatized (if required),

5.2.10 Dimensions (show thickness, minimum or nominal, width, flatness requirements, and length, (if cut lengths)).

5.2.11 Coil size requirements (specify maximum outside diameter (OD), acceptable inside diameter (ID), and maximum mass),

5.2.12 Packaging,

5.2.13 Certification, if required, heat analysis and mechanical property report,

5.2.14 Application (part identification and description), and

5.2.15 Special requirements (if any).

NOTE 1—Typical ordering descriptions are as follows: steel sheet, zinc-iron alloy-coated, DP Grade 590T/340Y, ASTM A1079, Coating Designation 45A45A, not chemically treated, oiled, minimum 1.00 by 1200 mm by coil, 1520 mm maximum OD, 600 mm ID, 10 000 kg maximum, for B side pillar.

NOTE 2—The purchaser should be aware that there are variations in manufacturing practices among the producers and therefore is advised to establish the producer's standard (or default) procedures for thickness tolerances.

6. Chemical Composition

6.1 *Base Metal:*